

Activity 03-16 Laboratory Techniques: Accuracy of a Balance Scale

Objectives: Compare measurements on a balance scale to standard masses. Compare balance scales for precision and accuracy.

To measure the mass of an object on a balance scale, you balance the object against **standard masses** attached as riders on the scale. **Accuracy** is the closeness of your measurement to the truth or actual measurement. An accurate measurement depends on having an accurate set of standard masses and an accurately calibrated balance scale. One of the things that can reduce the accuracy of a standard mass is a build-up of oil and dirt from improper handling. (You should use tongs to handle standard masses.)

Precision has to do both with the ability of the scale to measure in smaller and smaller increments as well as measurements taken that are very close together. You will be using two different scales and comparing them for their accuracy and precision.

Materials:

Triple Beam Balance Scale
Hanging Pan Balance Scale
Standard Masses



Part A Procedure:

1. Ensure that the **hanging pan balance scale** is perfectly balanced with the riders set at zero and the pointer pointing directly at the scale.
2. Using the tongs, place the one gram standard mass on the hanging pan balance scale and determine its mass.
3. Using the tongs to place the standard masses on the scale, determine the mass of the two gram, five gram, ten gram, twenty gram, and fifty gram standard masses.

Data:

Object	Mass of Standard
1 gram mass	
2 gram mass	
5 gram mass	
10 gram mass	
20 gram mass	
50 gram mass	

Part B Procedure

1. Ensure that the **triple beam balance scale** is perfectly balanced with the riders set at zero and the pointer pointing directly at the scale.
2. Using the tongs, place the one gram standard mass on the triple beam balance scale and determine its mass.
3. Using the tongs to place the standard masses on the scale, determine the mass of the two gram, five gram, ten gram, twenty gram, and fifty gram standard masses.

Data:

Object	Mass of Standard
1 gram mass	
2 gram mass	
5 gram mass	
10 gram mass	
20 gram mass	
50 gram mass	

Analysis:

1. What is the maximum amount of mass that the hanging pan balance scale can balance?
2. What is the maximum amount of mass that the triple beam balance scale can balance?
3. How accurate was the hanging pan balance scale? How accurate was the triple beam balance scale?
4. Is there a difference in precision between the two types of scales? If there is, how does the experimenter communicate a difference?
5. How might the accuracy and precision of a balance scale affect the ability of a pharmacist to correctly fill a prescription?